Water innovation: management, society, economy, technology

Oded Distel

June 2016
WATER IS USED FOR...

15,400 liters of water to make one kg of BEEF

400,000 liters of water to build a CAR

130 liters of water to make one cup of COFFEE
By 2050, 66% of the world’s population will suffer from shortage of drinking water. In urban areas, 25% of the water is being lost due to leaks and network delivery problems. 5% of global irrigated land is using drip irrigation. In developing countries, 90% of wastewater is discharged untreated into rivers, lakes, and oceans.
New Delhi water prices

Private consumer- differential price:

<table>
<thead>
<tr>
<th>Household consumption (monthly)- CM</th>
<th>Price per CM (US Dollar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>0.03</td>
</tr>
<tr>
<td>10-20</td>
<td>0.05</td>
</tr>
<tr>
<td>20-30</td>
<td>0.28</td>
</tr>
<tr>
<td>30</td>
<td>0.46</td>
</tr>
</tbody>
</table>

- Municipality and private Water Tanker- ~$4 Per CM
- Mineral Water- $70 Per CM
Necessity is the mother of Innovation

If it ain’t broken don’t fix it
WATER IN SYRIA

• Inadequate water management
  – Groundwater over pumping
  – High-water consuming crops
  – Low maintenance of water infrastructure -> high NRW
  – New dams (Syria & Turkey)

• When the drought hit
  – 75% of farmers lost their yields, 85% of herds were lost
  – Immigration to big cities
  – Unstable water supply, increased poverty, 20% of population without food security

• A key contributor to the Syrian uprising
WATER DECOUPLING

Estimated population water demand, Total Water and Fresh Water Supply 1961-2010

Type One Decoupling: water resources and population water demand decouple.

Type Two Decoupling: Blue water and total water resources decouple. The trend is enhanced ten years after starting.

Virtual Water predominantly bridges gap between population water requirement and national supply.

Source: Decoupling dependence on natural water, Glimont M., 2014
WATER DECOUPLING

- Natural water refill: 1170 MCM (per year)
- Water consumption: 2030 MCM (per year)

- Annual Shortage of over ~45%

- Daily Domestic Consumption Per Capita ~170 Liters

Source: Israeli Water Authority
WASTEWATER TREATMENT IN ISRAEL

Annual sewage average:
- 508 mcm per year
- 468 mcm is collected and treated (92%)
- 400 mcm is reclaimed for irrigation (85%)

Israel has devoted numerous resources to the development of waste water treatment and reclamation, applying innovative secondary and tertiary treatment.
Desalination in Israel

Desalination plants supply 70% of the domestic water consumption.
ELEMENTS OF THE ISRAELI WATER SECTOR

5 Elements:

1. Clear Legal Framework
2. Integrated Water Management
3. Water Saving Society
4. Water Economy
5. Technology
The Water Law 1959 – Legal Basis

- Water is owned by the public and managed by the Government
- Administrative control over all aspects of water use (Consumption, Allocations, Productions, Pollution, Pricing...).
(3) WATER SAVING SOCIETY

Advertisements

Water Authority Website
“...Rain rain go away come back another day...”

"גשם, גשם משמיים, כל היום טיפות המים טיף טף, טיף טף –מחא וכח!..."
(4) WATER ECONOMY

Water price reflects its real value

Production cost of 1 m³ water in Israel

Total cost to consumer: 2.23 $ (under 3.5 m³) / 3.68 $
(5) WATER TECHNOLOGIES

350 innovative companies

- Water management
- Water desalination
- Irrigation
- Urban water solutions

Sector highlights

- Israeli systems account for 50% of the world's low-pressure irrigation systems, reducing agricultural water consumption by one-third.
- Israeli companies have installed more than 350 desalination plants in nearly 40 countries.
- Less than 10% national average for NRW.
- 85% of Israel’s wastewater is reclaimed for agriculture – the highest percentage in the world.

Source: Israel Export Institute, The Israel Water Authority
<table>
<thead>
<tr>
<th>Pricing</th>
<th>Awareness And education</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>Business Models</td>
<td>Policy and Regulation</td>
</tr>
</tbody>
</table>